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CLAIMS

1. An antenna, comprising a first group of part-spherical dielectric lenses supported on a first portion of a conducting ground plane arranged to reflect signals emerging from the lens, each of the lenses having a plurality of associated switchably selectable antenna feed elements disposed around the periphery of at least one sector of the lens for injecting signals into and/or receiving signals propagated by the lens, wherein each lens and the associated feed elements of the first group has a different orientation and is operable to provide coverage in respect of a different region, and a second group of one or more spherical or part-spherical dielectric lenses and associated switchably selectable antenna feed elements oriented and operable to provide coverage to a region other than that covered by lenses of the first group.
- 15 2. An antenna according to Claim 1, wherein the first portion of the conducting ground plane is substantially annular and surrounds a well-like portion of the antenna, and wherein the second group of one or more lenses is located within said well-like portion.
- 20 3. An antenna according to Claim 2, wherein the second group of one or more lenses comprises a spherical lens, located within said well-like portion of the antenna.
- 25 4. An antenna according to Claim 1 or Claim 2, wherein the conducting ground plane further comprises a second portion inclined differently to the first portion, and wherein the second group of one or more lenses comprises at least one part-spherical lens supported by the second portion of the ground plane.
- 30 5. An antenna according to Claim 4, wherein the second portion of the ground plane is arranged to form the side-walls of said well-like portion.

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6. An antenna according to any one of claims 2 to 5, wherein the first portion of the ground plane surrounds a substantially square well-like portion and wherein the first group of one or more lenses comprises four part-spherical lenses disposed with substantially equal spacing around the well-like portion.

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7. An antenna according to Claim 6 when dependent upon Claim 5, wherein the second group of one or more lenses comprises four part-spherical lenses each one supported on a different side-wall of the well-like portion.

10 8. An antenna according to Claim 4 or Claim 5, wherein the conducting ground plane further comprises a third portion inclined differently to the first and second portions and wherein the antenna further comprises a third group of one or more part-spherical dielectric lenses, each having a plurality of associated switchably selectable antenna feed elements, supported by the third portion of
15 the conducting ground plane and operable to provide coverage to a different region to those covered by the first and second groups of lenses.

9. An antenna according to any one of the preceding claims, wherein each of said antenna feed elements is located at a point on the focal surface of the
20 respective dielectric lens.

10. An antenna according to any one of the preceding claims, further comprising a switching network operable to select one or more of the antenna feed elements associated with said groups of lenses.

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11. An antenna according to Claim 10, wherein said switching network is a binary switching array.

30 12. An antenna according to any one of the preceding claims, further comprising a frequency-selective surface arranged to provide an enclosure for said lenses of the antenna and operable to permit passage of signals used by the antenna but to absorb or reflect other signals.

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13. An antenna according to Claim 12, wherein said frequency-selective surface is arranged to have an aerodynamically low-drag profile.

14. An antenna according to any one of the preceding claims, operable to
5 provide simultaneously a plurality of independent radiation beams in different directions.